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New Zealand Hepaticae (Liverworts)—XVIII
A Review of the New Zealand Species of the Genera *Pallavicinia* and *Symphyogyna*

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Summary

INTRODUCTORY NOTE: Genera *Pallavicinia* and *Symphyogyna* treated with their respective species.

Key to the following species of *Pallavicinia*: *P. connivens* (Col.) Steph., *P. lyellii* (Hook.) Gray, *P. innovans* Steph., *P. xiphoides* (Hook. and Tayl.) Steph., *P. tenuinervis* (Hook. and Tayl.) Steph.

Key to the following species of *Symphyogyna*: *S. hymenophyllum* (Hook.) M. and N., *S. prolifera* Col., *S. subsimplex* Mitt., *S. undulata* Col.

THE genera *Pallavicinia, Symphyogyna, Hymenophyton* and *Podomitrium,* of the family *Pallaviciniaceae* form a natural group of frondose liverworts, in the midrib of which there is a conducting strand of tissue of elongate, thickwalled, pitted cells. In New Zealand, the genera *Pallavicinia* and *Symphyogyna* each have a stipitate, dendroid species, *P. connivens* and *S. hymenophyllum,* as well as several with ± simple procumbent fronds. It is thought probable (Smith, 1966) that the dendroid forms represent more highly evolved states in the *Pallaviciniaceae.* By analogy, it might still be considered that *Hymenophyton flabellatum* (Hook.) Steph. (dendroid) might be a highly developed form of *Podomitrium phyllanthus* (Hook.) Mitt.

In dendroid forms, the thallus is divided into a basal rhizome, an ascending stipes and a divided assimilatory frond.

Branches arising from the ventral side of a midrib or a stipes develop an apical cell of their own, whereby the innovation develops normally, with the central strand unconnected with that of the parent frond and therefore capable of detachment and of growing independently, a form of asexual reproduction.

KEY TO GENERA

Involucre a ring-like structure surrounding the pseudoperianth and sporophyte, pseudoperianth always present, shorter or longer than the calyptra	*Pallavicinia*
Involucre a scale, lobate, lobes variously toothed or laciniate, pseudoperianth absent, calyptra with sporophyte from the axil of the scale	*Symphyogyna*

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PALLAVICINIA S. F. Gray

Plants thalloid, dioicous, prostrate and creeping or stipitate and dendroid from a cylindrical rhizome. Margins entire or toothed. Branching occasionally furcate, more often ventral from the midrib. Midrib with a central strand of narrow elongated thick-walled pitted cells in which the protoplasm has died, forming conducting tissue, surrounded by parenchymatous cells of varying depths. Involucre a ring-like structure usually cup-shaped, with laciniate lobes, enclosing a group of archegonia on the dorsal surface of the frond. Pseudoperianth arising inside the involucre around a fertilised archegonium. Calyptra basally more or less coalescent with the pseudoperianth or free. Capsule oblong-cylindrical of four valves of two layers of cells, without semi-annular thickenings, elaters 2–3 spiralled, spores reticulated or faintly papillose. Antheridia in the axil of a toothed scale, biseriate on the midrib or more rarely in clusters.

It is known that both frond and central conducting strand of the nerve or midrib may be variable as to size and shape, being easily influenced in culture, and allowances must be made for this in considering specific distinctions. The same applies to *Symphyogyna.*

KEY TO SPECIES OF PALLAVICINIA

1. Plants erect, dendroid, stalk often pink, narrowly winged with rhizoids from a creeping rhizome, margins of frondlets toothed to lobate-toothed, conniving ..... *P. connivens*
   Fronds procumbent, forked or with ventral branches, depressed, caespitose, more or less stalked 2
2. Margins entire or slightly bulging in places 3
   Margins toothed 4
3. Frond of medium breadth and length, stalks of varying length, winged somewhat by reason of the decurrent thallus, pseudoperianth tubular, elongate to 9mm, mouth longly piliferous ..... *P. lyellii*
   Frond narrow elongate to 4cm in specimens seen, branches may be very narrow with secondary branches, often tapering, pseudoperianth to 3mm, not tubular, mouth irregularly piliferous ..... *P. tenuinervis*
4. Frond short, *ca* 1cm (including stalk), 2.8–4mm wide, of soft texture, nerve pale, conspicuous, pseudoperianth large, plicate, mouth dentate-ciliate ..... *P. innovans*
   Frond elongate, 1–5cm or more, 1–3mm wide, marginal teeth often large, variously spaced, pseudoperianth tubular, to 5mm, mouth lobed, lobes piliferous, common but rarely fruiting ..... *P. xiphoides*

Pallavicinia connivens (Col.) Steph.

Symphyogyna connivens Col.
Makednothallus connivens (Col.) Schust.
Jensenia connivens (Col.) Grolle

This species was described in Misc. 2 (Hodgs., 1967), in which reasons were given for the non-acceptance of a separate genus *Jensenia* syn. *Makednothallus* for this species. It is our only dendroid species of *Pallavicinia,* with a comparatively long, narrowly winged, reddish stalk from a creeping rhizome surmounted by a spreading divided thallus, the frondlets of which are toothed to strongly toothed or dentate-lobate, the margins usually conniving. The expanded portion is smaller than that of *Symphyogyna hymenophyllum,* and from *Hymenophyton flabellatum* and *H. leptopodon* it may be distinguished by the toothed margins.

Additional locations for this species are: on clay stone rock Parua Bay, Northland, 3004 D. S. Harnett; Makorako, Kaimanawas, 5,000ft, 13615 A. P. Druce with *Lepidozia laevifolia, Adelanthus variifolius* Hodgs. *publicanda:* in sink holes and watercourses, Whahahuia Range, Ruahines, 5,000ft with *Phyllothallia nivicola* 13616 A. P. Druce, Feb., 1967.

Lake Roto-iti, Nelson, 3691 B. M. Kidson.

With regard to Schuster's statement (1963: 292), that "the calyptra of *Makednothallus* is in part apparently connate" with the pseudoperianth, whereas

it is "free" in *Pallavicinia* s. str., Stephani (1892: 271), in making the new combination *Pallavicinia connivens* (Col.) Steph., has the following note, relevant to his non-acceptance of *Mittenia* G. (a homonym = *Makednothallus* Verdoorn) for this species.

". . . In a flower of *Pallavicinia lyellii* we find the pistils (archegonia) at the base of the young calyptra; later on they are found scattered over its surface, a consequence of the growth of those cells which surround it at the base and on which the pistils (archegonia) are inserted. A more enlarged activity of the basal cells and a participation of the whole *torus pistillorum* will at once bring the calyptra to adhere to the perianth.

If, therefore, we separate *Mittenia* (*Makednothallus*) from *Pallavicinia* we merely mark the intensity of a process which is going on in both."

Pallavicinia lyellii (Hook.) Gray

Steetzia lyelii (Hook.) Mitt. in *Fl. nov. zel.* II, 165, 1855; Hook. *Handb. N.Z. Fl.* II, 541, 1867.

This species is widely spread throughout the world. Of New Zealand specimens collected by Colenso, Mitten writes (1855: 165), "The New Zealand species do not differ from those gathered in Britain, except that the perianth is rather longer". A specimen H260 from damp shady bank near Atiamuri, identified by Herzog as *Pallavicinia lyellii,* has the pseudoperianth 8–9mm long, with mouth piliferous, and fronds with short stipes. A specimen of Colenso's, Col. 4859, also has a long tubular pseudoperianth, but the fronds have long stalks, partly winged by the decurrent thallus, rhizoids plentiful.

A South Island specimen from roadside banks near Lake Iolanthe, South Westland, 5057 W. M. resembles Colenso's in the long partly winged stipes, often branched, with rhizoids plentiful, and also has longly stalked ventral innovations. The fronds with reddish nerve and stipes are tufted and erect, with ♂ and ♀ mixed. The involucres and pseudoperianths are those of *P. lyellii.*

Another ♂ specimen is from Bluff Hill, Foveaux Strait, 4957 E. H. Walker. The androecia may be on either side of the midrib or restricted in a bunch to the upper portion. The spores of this species according to Macvicar are finely reticulate, the margins appearing as slightly papillose.

Sterile specimens also placed here are: from dripping wet bank, Mount Egmont *c* 4,000ft 1333 A. P. Druce; Brook Reserve, 10449 Dr G. Cone: With *Jungermannia hodgsoniae* Grolle nom.nov. (syn. *J. grandifolia* (Berggr.) Hodgs.) two miles beyond Franz Josef en route to Fox Glacier, coll. J. Taylor, 13613 Herb. Hodgs. 135698 CHR pp.

A specimen from a cave by Rainbow Falls, Keri Keri, Northland, V. Lindauer 8067, seems more rigid than usual with thick cell walls and with the marginal row of quadrate cells quite conspicuous. Unfortunately the pseudoperianth is undeveloped.

Pallavicinia tenuinervis (Hook. and Tayl.) Steph.

Jungermannia tenuinervis (*Diplolaena tenuinervis* Hook. and Tayl.) *Lond. Journ. of Bot.,* 509, No. 39, 1844.

Blyttia tenuinervis (Hook. and Tayl.) G. L. and N. 47, 1846.

Steetzia tenuinervis (Hook. and Tayl.) Mitt. *Fl. Nov. Zel.* ii, 165; Hook. f. *Handb. N.Z. Fl.,* II, 541, 1867.

Pallavicinia tenuinervis (Hook. and Tayl.) Steph., *Spec. Hep.* I, 315, 1900.

Terrestrial, fronds to 6cm including stipes 2cm and somewhat pinkish (8107) (1–2 inches in *Handbook*), sometimes attenuated, slender 0.2–0.35mm broad, margins entire or bulged in places, branches ventral from the midrib, again longly and slenderly branched in CHR 4967.

Cells quadrate to rectangular, *ca* 40μ walls medium to thick and horny, marginal variable in shape, quadrate to narrow rectangular. Involucre campanulate, *ca* 1mm, lobulate with lobules irregularly fimbriate, pseudoperianth short, 3mm in 2785 plicate, with a wide mouth.

The entire margins will distinguish this species from *P. xiphoides*. The midrib does not appear to be perceptibly thinner than in that species. The *Handbook*, p. 541, suggests that *P. tenuinervis* may be a form of *P. lyellii*, but the pseudoperianth is quite different and the fronds usually elongate and narrower.

Fruiting specimens are from: Greymouth, coll. Helms, det. Stephani 011980 G; banks by waterfall, Pegasus Creek, Stewart Is., 2785 W. Martin.

Also seen: from Okarito coll. Kirk, 011981 G; Okarito coll. Hamilton in Kirk's collection 124967 CHR; Supper Cove, Fiordland, H. H. Allan 8107 Herb. Hodgs.

The type appears to have been collected by Colenso.

Pallavicinia innovans Steph. Spec. Hep., I, 213, 1900

Pallavicinia setchellii Pears. (1923) syn. nov.

Plants dioicous, small, bright green when fresh, fading to pale straw-coloured, densely caespitose-depressed, to 1cm long. Stalk short, or to as long as the expanded portion of the frond, flexuous, may be reddish with abundant rhizoids near the base, narrowly winged, then expanding into an oblong or sub-orbicular thallus, simple or furcate, sometimes decurved, margins usually connivent, to 0.7cm × 2.8–4mm wide. Midrib pale, maybe red, plano-convex, very thick, 0.4mm, thinning somewhat abruptly into the wings, central strand of small cells, round, one-third the width of the nerve, surrounded by larger cells, containing in one instance a ring of purplish cells to the side of the central tissue, rhizoids sometimes proceeding from the lower surface. Wings to nearly 2mm wide, 3–4 cells thick near the midrib, thinning to 1 cell thick at the margin, often connivent; margins distantly dentate-serrate, teeth almost hamate, 2–4 cells wide at the base, quadrate to 6-sided, *ca* 35–40μ, longer near the midrib, smaller at the margin. In some fronds the cells are as large as 60μ, and hyaline. Involucre cup-shaped, shortly to deeply multi-lobed, lobes spinose-dentate. Pseudoperianth large, almost reaching the apex of the frond, longer than the calyptra, plicate when fresh, mouth dentate-ciliate. Calyptra free, tender; seta moderately short; capsule 2mm, oblong cylindrical; spores pale yellow-green cells ± rounded, convex, thick-walled, clear or opaque; elaters pale yellow-green, from 0.2–0.35mm, flexuose. Antheridia on either side of the upper portion of the frond, bract toothed.

The large plicate pseudoperianths are most striking recalling those of *Jamesoniella tasmanica* when fresh and green. The short, broad, softly textured fronds with toothed margins, and conspicuous whitish midrib will also help to distinguish this species. However, ventral innovations have not been noticed, nor does Pearson mention them.

A specimen so named, from Tauranga coll. T. Kirk, 112, 011566 Geneva, agrees well enough with the following specimens:

North Island: high damp bank beside path, Okere Falls, Rotorua, 1681 E. A. H.; shady stream bank, Puarenga Stream near Whakarewarewa, 4790; on rock face, dry and shady, near Atiamuri 4787 K. W. A.; on ignimbrite cliff *ca* 2,000ft, Waihaka River, Western Taupo, 5964 A. P. D.; near Mount Egmont, Taranaki, E. O. Campbell; boulder in Utahina Stream, three miles west of Rotorua, 13458 coll. A. E. Wade.

A study of Pearson's type of *P. setchellii* UC 213704 reveals no specific differences from *P. innovans*.

Pallavicinia xiphoides (Hook. and Tayl.) Steph.

Diplolaena xiphoides Tayl. *Lond. Journ. of Bot.*, 3, 569, 1844, Fig. 6.

Blyttia xiphoides G. L. and N. *Syn. Hep.*, 476, 1846.

Steetzia xiphoides (Hook. and Tayl.) Mitt. *Fl. Nov. Zel.*, ii, 165, 1855; Hook. *Handb. N.Z. Fl.* 541, 1867.

Pallavicinia xiphoides (Hook. and Tayl.) Steph., *Spec. Hep.*, i, 314, 1900.

This species is not uncommon on shaded damp banks in bush growing in extended mats. Evans (1930) gives a detailed account of the structure of the frond, both stipes and thallus. The thallus is characterised by its narrowness, 1–3mm combined with its length to 5cm. The frond may be straight or flexuous, rounded at the apex or longly tapering, specially noticeable in 6198 and 6199 from Mokai Patea (Druce). The marginal serrations are variable. From a base of 2–3 cells they may be remote or close, tapering to as long as 0.5mm, usually curved inwards towards the thallus or even hamate.

The species is rarely found fruiting and except for the fortunate presence of involucres on Taylor's type (Hooker, Bay of Islands), which determined the genus, the fructification appears to be undescribed, hence the following:

Involucre to nearly 2mm, cleft to the base on the upper side (nearest the apex of the frond), deeply 4–5 lobed, lobes variously toothed, sometimes with rounded sinuses. Pseudoperianth to 5mm, narrow, tubular, a little arched, lobed at the mouth, lobes piliferous. Calyptra appears to be joined with the pseudoperianth to somewhat less than half the length of the pseudoperianth. Seta long. Capsule *ca* 1.8mm, narrowly oval, 2-valved when dehisced; cells of inside and outside the capsule wall narrow, irregularly elongate, often with oblique ends, without thickenings on cell walls; elaters to 0.5mm, extremely thin and attenuated at both ends; spores not seen. The inflorescence may be bulbous and pinkish at the base. Antheridia in two rows, one on each side of the midrib, bracts closely or scarcely imbricate, bidentate, with or without a rounded median lobe.

Fruiting fronds are from:

North Island: Mount Wharite, South Ruahines, coll. R. M. Greenwood 243, 4783 Herb. Hodgs.; road cutting in bush, Mangahao Dams, Tararuas, E. A. H., 10604.

South Island: on clay bank, with *Polytrichum commune, Pogonatum subulatum,* South of Hokitika Bridge, 13211, W. Martin: Franz Josef Glacier, South Westland, 9477, E. O. Campbell, ♂ and ♀.

Sterile depressed patches are fairly common in both islands.

SYMPHYOGYNA Nees and Montagne

Vegetatively, *Symphyogyna* resembles *Pallavicinia.* It differs in the I-scaled involucre free at the edges, and the absence of the pseudoperianth around the calyptra. The presence of the involucral scales usually intermittent along the midrib will identify the genus in the absence of the sporophyte.

Fronds prostrate except in *S. hymenophyllum,* simple or furcate, margins flat or waved or crinkled, sometimes recurved in places, entire or toothed, teeth remote and usually small or visibly fairly close, not lobed in New Zealand species; nerve biconvex or ventrally produced, thinning abruptly or gradually into the wings, the adjacent cells elongated, yellowish-green or conspicuously dark in *S. undulata,* remaining cells of wings fairly uniform, marginal quadrate to rectangular, walls usually thick, or thinner in more delicate fronds; conducting strand of nerve always present, with threads of elongated, thick walled, pitted, end to end cells empty of chlorophyll. Calyptra stout, mucose and roughened with adhering extraneous particles, arching from under the flat-lying involucral scale of varying width and uneven upper margin. Seta of capsule long and tenuis, capsule narrow cylindric, of four valves cohering at the apex for a time, after dehiscence along the margins of the valves, spores and elaters in a red-brown mass, spores small faintly papillose, elaters long, thin, attenuated, loosely spirally banded, cells of capsule walls narrow, elongate, of irregular lengths in two layers usually, without thickenings. Antheridia on separate fronds shortly stalked, on or alongside the nerve on the dorsal surface or in clusters or cushions, usually protected by an overarching scale, singly, or in little groups.

KEY TO SPECIES OF SYMPHYOGYNA

1. Plants erect, stipitate with stalk expanded into a dichotomously branched flabellate lamina, margins toothed, frondlets flat ..... *S. hymenophyllum*
   Plant procumbent ± elongate, usually forked, with or without ventral innovations 2

2. Margins entire 3
   Margins toothed, frond terrestrial, variable in size and shape, marginal teeth from closely serrate to remote or almost obsolete on elongate frond, involucral scale variable in size and shape, calyptra 5–6mm .... *S. prolifer*
3. Fronds mostly on tree-ferns, light green, margins flat, nerve yellowish, biconvex, stalk one-third to one-half as long as lamina, antheridia usually in two rows .... *S. subsimplex*
   Fronds terrestrial, margins undulate, often ascending, rhizoids numerous, darkish, midrib thick and wide, dark in colour, antheridia usually in intermittent or terminal clusters .... *S. undulata*

Symphyogyna hymenophyllum (Hook.) M. and N.

Symphyogyna biflora Col. *Trans. N.Z. Inst.*, 15, 337, 1883, type No. 2070.
S. rubricaulis ibid. Trans. N.Z. Inst., 16, 349, 1884, type No. 2262.
S. melanoneuron Col. *ibid.* p. 350, type No. 2069.
S. vulgaris Col. *ibid.* p. 352, type No. 2049.
S. crispula Col. *Trans. N.Z Inst.*, 17, 261, 1885, type No. 1415.
S. flavo-virens Col. *ibid.* p. 262, type No. a1413.
S. nigricaulis Col. type No. 2067.

Plants dioicous, terrestrial, fronds from a creeping rhizome, with a stalk of varying lengths, partly winged sometimes flexuous, rarely more than 2cm, expanding into a simply divided or flabellate frond, forked then dichotomously branched to as many as eight ultimate frondlets, the nerve forking at the dichotomies. Width of segments usually *ca* 2mm, unistratose, margins sometimes sinuous, always toothed, teeth usually of two cells from a base of two cells wide. Nerve brownish, convex ventrally, abruptly differentiated from the unistratose wings. Cells of wings thick-walled, hexagonal or rhomboid *ca* 40μ, marginal cells not elongated as stated by Stephani (in specimens seen). Involucral scale in a fork of the nerve, usually, quadrate-rectangular, lobulate, lobules usually simple but longly spinose, archegonia numerous in the axil of the scale. Calyptra whitish, to 5mm long, mouth surmounted with dead archegonia, seta to 3cm, cells becoming elongated as it grows, 0.4mm wide at base of capsule; capsule 4.5mm of narrow valves with inner and outer walls of elongated cells with unthickened walls; spores *ca* 20μ, papillae not detected, elaters not, or scarcely attenuated, closely bispiralled. Antheridia in longitudinal rows, extending along the basal portion and arms of the nerves, protected by a scale, one scale sometimes protecting more than one antheridia (Finlayson, 1950), stalk of antheridia never more than two cells.

On the whole, this is a small species, however, as one may gather from Colenso's synonyms, it is variable. Fronds with longer stalks, to 3cm, tend to have fewer dichotomies in the lamina, thus approximating Taylor's *S. obovata,* from Australia if this is really distinct. The longer stalks may be blackish and more wiry. The texture varies also, from softish to more rigid.

Hooker's type (1818, Pl. 14), from Dusky Sound, coll. Menzies, shows five fronds erect from a horizontal rhizome, with stalks of varying lengths, and irregularly dichotomously branched laminas, one short frond with a simple fork.

Not uncommon throughout New Zealand. Also from Chile (*S. stipitata* Steph., *S. chiloënsis* Steph., *S. lanceolata* Steph.) Australia, Juan Fernandez.

Dr Proskauer has observed that from a specimen patch picked up in the type of *S. stipitata* = *S. hymenophyllum* locality, there is a gradient from fronds resembling *S. prolifer* to those of the erect, flabellate *S. hymenophyllum.* However in New Zealand the specific differences are sufficiently plain and constant to let stand.

Symphyogyna subsimplex Mitt.

S. subsimplex Mitt. *Fl. Nov. Zel.* II, 166, 1855.
S. simplex Col. *Trans. N.Z. Inst.*, 16, 352, 1884, syn. nov.
S. brevicaulis Col. *Trans. N.Z. Inst.*, 18, 251, 1886, syn. nov.

Plants dioicous, usually on tree-ferns, pale, tender. Fronds usually all separate, to 4.5cm long including the stalk, simple or more rarely furcate, apices a little retuse, stipitate, margins entire, wings to 6mm wide attenuated towards the base becoming decurrent along the narrowly winged, pale or rose-red stalk with numerous basal rhizoids; midrib narrow, biconvex, not thinning gradually into the wings. Cells fairly uniform and clear *ca* 40μ. but

elongated and shapeless in the area adjacent to the nerve. Involucral scale variable in size and shape, to 1mm in length, rectangular to quadrate with parallel sides, 2–4 shallowly to deeply lobed. Calyptra shortish, from barely 3 to 4mm, clavate with dead archegonia on the surface and/or around the mouth. ♂ bracts irregularly dentate-lobate, in two rows becoming clustered on and adjacent to the midrib, may be intermittent, or in a single row over the midrib.

S. brevicaulis Col. recognised by Stephani and Schuster has a shorter stalk than is usual, but the length of the stipes does vary considerably, also the degree of decurrence of the wings.

North Island; bush around Blue Lake, Rotorua 9671; Ohuka, Wairoa 2920; Waikaremoana 8101; Maungapoike Falls, Wairoa 8060; Mangahao Stream, Tararuas, 1058; Puke-iti, Taranaki 10208 E. A. H.; Puaiti Bush, Rotorua, 77 K. W. A.; bush, Pirongia, E. O. Campbell; Stratford, 9808 W. Martin; Kapiti Island, 2511 A. P. Druce; Colenso No. a1291.

South Island: Kenepuru V., Marlborough, 119 J. H. McMahon; Lone Pine Track, Waiho, Westland 12574 W. M.; Supper Cove, Fiordland, with *Zoopsis caledonica,* H. H. Allan.

Stewart Island: Wilson's Bay Forest 2292 subno. 432 W. Martin.

Chatham Islands: Tableland Forest, Nairn R. Source, 12964 J. F. Findlay.

The type was from Bay of Islands col. J. D. Hooker. Stephani mentions several collectors and also records it from Samoa.

Symphyogyna undulata Col.

S. undulata Col. *Trans. N.Z. Inst.,* 16, 356, 1884.
S. marchantioides Col. *ibid.* syn. nov.
S. pseudoterebellata Hodg. and Herz. (Hodg., 1965) syn. nov.

Plants dioicous, medium to moderately large, on damp earth, particularly on clay, papa, or limestone seeps, not necessarily in shade. Fronds may be crowded, overlapping, simple or once or more forked, rarely tinted, *ca* 2.5cm long × 0.5mm broad, margins entire, waved; stipes very short, midrib broad, caniculate, dark, produced on the ventral surface, rhizoids abundant, in extended bunches, pale brown or brown; wings ascendant when crowded, polystratose from the somewhat abruptly attenuated nerve, cells indistinct, marginal *ca* 30μ, hexagonal; involucral scale at intervals along the midrib, small to medium, oblong to quadrate, variously lobate-lacerate; calyptra pale to light brown, 4mm long from a narrow base, to 1.3mm wide, faintly striate, with occasional dead archegonia adhering, mouth erose, also with occasional archegonia. Seta short or long, capsule 4-valved, valves cohering at the apex when ripe, capsule wall bistratose, all cells irregularly elongate, walls wavy. Spores at least 30μ, papillose, red-brown; elaters long, thin tapering, loosely spirally banded. Androecia usually crowded near the apex of the frond or the apices of forks; scales short, bidentate, may be tinted, sometimes extended along the midrib.

With quantities of *S. undulata* at hand I now believe that *S. pseudoterebellata* is merely a crowded foreshortened form of that species. It has the darkened nerve, the crowded antheridia, the numerous dark rhizoids and the undulate margins. On the other hand well developed single fronds of *S. undulata* may be very similar to those of *Allisonia cockaynii* and in fact, Colenso's description of his *S. marchantioides* fits a sterile frond of *Allisonia* very well. However, the remainder of his description pertains to *Symphyogyna.*

Common in the North Island.

South Island: Weka Pass, North Canterbury, 8065 V. D. Zotov; along main road, Lewis Pass, *ca* 2,500ft, 11792 L. Visch; Cass 11312 W. R. Philipson F4 and 11311 F3.

Colenso's type from decomposing limestone rocks and cliffs, Petane, near Napier, coll. A. Hamilton.

Symphyogyna prolifer Col.

S. prolifer Col. *Trans. N.Z. Inst.*, 6, 355, 1883.
S. grandibracteata Steph. *Spec. Hep.*, 1, 330, 1900, syn. nov.
S. crassicosta Steph. *Spec. Hep.*, i, 331, 1900, syn. nov.
S. microcalyptra Pears. (1923), syn. nov.
S. rhizobola Nees sensu Mitt. 1855, Hook. 1867.

Plants dioicous, terrestrial on damp banks in shade. Fronds usually dark to brownish-green, prostrate and overlying, irregular in size and shape, but often elongate, 1–4mm wide to 5cm long but usually shorter, with or without a reversion to a winged stalk, apices attenuated, but more often forked and rounded, sometimes thin, margins always toothed, sometimes closely serrate or with teeth remote and projecting, or parallel with, or inclined towards the frond, margins may be crisped. Midrib thin *ca* 10 cells in depth abruptly passing into the wings. Cells of wings fairly uniform, but elongated and greenish near the midrib, otherwise quadrate–hexagonal, 40–50μ, walls thick, marginal teeth variable but usually 2–3 cells long based on two cells. Invol. scale at intervals along the midrib variable in size and shape usually deeply 2-multilobed appearing lacerate to 2mm long, widened towards the apex, lobes narrow. Calyptra 5–6mm long × 0.9mm wide, whitish, with numerous spicules of clay adhering, mouth fairly even, dead archegonis may be attached near or about the apex, seta very long, capsule narrowly oval, to nearly 3mm long or a little more, elaters long attenuated very thin with two spirals, reddish-brown throughout, spores 15μ, scarcely smooth, both sides of capsule with similar cells, oblong 15–80 × 18μ, no thickenings. ♂ bracts in two or more rows adjacent to the midrib or crowded on the upper portion of the frond or fork, not less than 2-lobed.

Colenso's description is as follows: "Plant terrestrial, prostrate creeping, caespitose, imbricated in growth, rooting at middle and tips of fronds; fronds very irregular, of various shapes and lengths, but flat, mostly linear and very narrow, 1–3 inches long, 1–3 lines broad, obtuse, sometimes ovate-acuminate, 2–3 leaflike fronds issuing from near the base of the short stipe, fragile, irregularly sinuate and serrate, very thin, transparent and pale green, midrib stout with fine short hair-like rootlets scattered below . . . "

Though this species is quite common it is not often found in fruit, but the scale is generally present, whereby the genus can be determined, and *Pallavicinia* eliminated.

First collected by Sir J. Hooker in New Zealand, this species was early attributed to *S. rhizobola* (Schwaegr.) Nees, but that species, from Insula Borbonia (Syn. Hep. 483) is stoutly margined.

Type locality: in rich black mould, wet shady woods, Seventy Mile Bush, near Norsewood, W. Colenso; and at Glenross (a Hawke's Bay sheep station), fruiting plentifully, D. P. Balfour.

Pearson's type 213723 Hb. UC was from Kahikanui near Whakapara, North Island, originally labelled *Symphyogyna obovata* Tayl. var. *microcalyptra*. The calyptra is shorter, but indeed it may not be fully grown. I would not consider it a separate species.

Symphyogyna obovata (Hook. and Tayl.) was from Tasmania. It was undoubtedly dendroid with a dichotomously branched lamina, but in a large proportion of so-named samples from Geneva, the frond is prostrate and not flabellately expanded.

DOUBTFUL SPECIES

Symphyogyna tenuis Steph. *Spec. Hep.* vi, p. 69, 1926, from Stewart Island, leg. Cockayne.

A specimen from Stewart Island leg. Cockayne, labelled *S. crassicosta* det Stephani in the Auckland Museum, is not impressive. This could be an isotype. However, some delicate fronds from the Manawatu Gorge 519 R. M. Greenwood, with small marginal teeth, do agree with Stephani's description in having elongate

hyaline marginal cells. At most this could only be a varietal difference, I would say. The type from Geneva is awaited.

Symphyogyna monoica Steph. and *S. subpetiolata* Steph. are both mentioned by Colenso (1892 and 1893). I have no record of these species.

Symphyogyna purpuro-limbata Hodgs. (1965) is a nisnomer.

Symphyogyna rhodina (Hook. and Tayl.) G. L. and N. was from Tasmania, coll. Lyall. It was described as minute, tender, pellucid, linear, rose-red with dentate margins and a long calyptra. According to Stephani it was collected in New Zealand by Colenso. Greenwood's 519 from Manawatu Gorge could conceivably be this, though the rose colour is absent.

EXCLUDED SPECIES

S. megalolepis Col. (1884: 150); *S. foetida* Col. *ibid.*, *S. longistipa* Col. *ibid.*, all with entire margins, belong to *Hymenophyton* sp; also *S. platycalyptra* Col. (1887: 300).

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